Lucas Ondel

Ph. D. candidate

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Education

2012 – 2020 **Ph.D. in Automatic Speech Recognition**, *Brno University of Technology*, Czech Republic, Graduation expected during the Fall semester 2020 .

2010 – 2012 **Master's degree in Software Engineering**, *University of Avignon*, France.

2009 – 2010 **Bachelor's degree in mobile and embedded systems**, *University of Lyon*, France.

2007 – 2009 **Two years technical degree in computer science**, *University of Lyon*, France.

Ph. D. thesis

Title *Discovering a Phonological System from Speech: a Bayesian Approach*

Advisors Lukaš Burget

Description Theory and application of Bayesian models for the task of acoustic unit discovery. Including, but not limited to, Non-Parametric Mixture Models and Generalized Subspace Models

Master thesis

Title *Acoustic Keyword Spotting with hybrid HMM approach using the Kaldi Toolkit*

Advisors Mirko Hanneman and Jan Černocký

Description Building an hybrid (HMM-ANN) keyword spotting system with the Kaldi toolkit

Experience

2018 **Visiting student**, *Johns Hopkins University*.
Worked with Professor H. Hermansky on data-driven analysis of human hearing properties

2017 **Frederick Jelinek Memorial Summer Workshop**, *The Speaking Rosetta Stone - Discovering Grounded Linguistic Units for Languages without Orthography*.
Analysis of the several acoustic unit discovery algorithms on a low-resourced language (Mboshi)

2017 **Visiting student**, *Johns Hopkins University*.
Worked with Assistant Professor N. Dehak on combining Variational Auto-Encoder and Hidden Markov Model for acoustic unit discovery

2016 **Frederick Jelinek Memorial Summer Workshop**, *Building Speech Recognition System from Untranscribed Data*.
Explored the possible use of the Hierarchical Pitman-Yor Process for discovering acoustic units

2012 – 2016 **Teaching assistant**, *Brno University of Technology*.
Teaching assistant for course: *Signals and Systems*

2014 **Research internship**, *Telefonica*, Barcelona.
Development of a data-driven acoustic fingerprint for audio retrieval

2010 – 2011 **Mobile developer**, *Kreactive*, Lyon.
Development of iPhone and Android applications
- data security for sensitive applications
- 2D scenes rendering

2009 – 2010 **Mobile developer**, *AppsFactory*, Lyon.
Development of iPhone applications
- created an augmented reality system for mobile devices

Languages

French **Native**
English **Fluent**
Czech **Beginner**

Knowledge and Skills

Knowledge

Machine Learning Deep theoretical and practical knowledge of Bayesian generative models and Neural Network based models (discriminative and generative).

Speech Recognition In-depth knowledge of the whole speech recognition pipeline

Skills

Programming Languages Python, Julia, C, C++, Objective-C, Java

Software

BEER The *Bayesian spEEch Recognizer* (https://github.com/BUTSpeechFIT/beer). Python based machine learning toolkit to build phone-recognizer systems for languages with few or no transcribed speech recordings

References

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Publications

2020 Ondel, Lucas. "Discovering Acoustic Units from Speech: a Bayesian Approach". PhD thesis, to appear.

2020 Yusuf, Bolaji, Lucas Ondel, Lukas Burget, Jan Cernocky, and Murat Saraclar. "A Hierarchical Subspace Model for Language-Attuned Acoustic Unit Discovery". In: *arXiv preprint arXiv:2011.03115*. URL: https://arxiv.org/abs/2011.03115.

2019 Dunbar, Ewan, Robin Algayres, Julien Karadayi, Mathieu Bernard, Juan Benjumea, Xuan-Nga Cao, Lucie Miskic, Charlotte Dugrain, Lucas Ondel, Alan W Black, et al. "The zero resource speech challenge 2019: TTS without T". In: *arXiv preprint arXiv:1904.11469*. URL: https://www.isca-speech.org/archive/Interspeech_2019/pdfs/2904.pdf.

2019 Lucas Ondel, Ruizhi Li, Gregory Sell, and Hynek Hermansky. "Deriving Spectro-temporal Properties of Hearing from Speech Data". In: *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 411–415. URL: https://ieeexplore.ieee.org/document/8682787.

2019 Ondel, Lucas, Hari Krishna Vydana, Lukáš Burget, and Jan Černocký. "Bayesian Subspace Hidden Markov Model for Acoustic Unit Discovery". In: *Proc. Interspeech 2019*, pp. 261–265. URL: http://dx.doi.org/10.21437/Interspeech.2019-2224.

2019 Yang, Jinyi, Lucas Ondel, Vimal Manohar, and Hynek Hermansky. "Towards Automatic Methods to Detect Errors in Transcriptions of Speech Recordings". In: *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 3747–3751. URL: https://ieeexplore.ieee.org/document/8683722.

2018 Lucas Ondel, Pierre Godard, Laurent Besacier, Elin Larsen, Mark Hasegawa-Johnson, Odette Scharenborg, Emmanuel Dupoux, Lukáš Burget, Francois Yvon, and Sanjeev Khudanpur. "Bayesian Models for Unit Discovery on a Very Low Resource Language". In: *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 5939–5943. URL: https://ieeexplore.ieee.org/document/8461545.

2018 Plchot, Oldrich, Pavel Matejka, Ondrej Novotný, Sandro Cumani, Alicia Lozano-Diez, Josef Slavicek, Mireia Diez, Frantisek Grézl, Ondrej Glembek, Mounika Kamsali, et al. "Analysis of BUT-PT Submission for NIST LRE 2017." In: *Odyssey*, pp. 47–53. URL: https://www.isca-speech.org/archive/Odyssey_2018/pdfs/69.pdf.

2018 Wiesner, Matthew, Chunxi Liu, Lucas Ondel, Craig Harman, Vimal Manohar, Jan Trmal, Zhongqiang Huang, Najim Dehak, and Sanjeev Khudanpur. "Automatic Speech Recognition and Topic Identification from Speech for Almost-Zero-Resource Languages". In: *Proc. Interspeech 2018*, pp. 2052–2056. URL: http://dx.doi.org/10.21437/Interspeech.2018-1836.

2017 Hannemann, Mirko, Jan Trmal, Lucas Ondel, Santosh Kesiraju, and Lukáš Burget. "Bayesian joint-sequence models for grapheme-to-phoneme conversion". In: *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 2836–2840. URL: http://www.fit.vutbr.cz/research/groups/speech/publi/2017/hannemann_icassp2017_0002836.pdf.

2017 Hasegawa-Johnson, Mark, Alan Black, Lucas Ondel, Odette Scharenborg, and Francesco Ciannella. "Image2speech: Automatically generating audio descriptions of images". In: *Proceedings of ICNLSSP, Casablanca, Morocco*. URL: http://www.cs.cmu.edu/~awb/papers/hasegawajohnson17icnlssp.pdf.

2017 Kesiraju, Santosh, Raghavendra Pappagari, Lucas Ondel, Lukáš Burget, Najim Dehak, Sanjeev Khudanpur, Jan Černocký, and Suryakanth V Gangashetty. "Topic identification of spoken documents using unsupervised acoustic unit discovery". In: *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 5745–5749. URL: https://ieeexplore.ieee.org/document/7953257.

2017 Liu, Chunxi, Jinyi Yang, Ming Sun, Santosh Kesiraju, Alena Rott, Lucas Ondel, Pegah Ghahremani, Najim Dehak, Lukáš Burget, and Sanjeev Khudanpur. "An empirical evaluation of zero resource acoustic unit discovery". In: *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 5305–5309. URL: https://ieeexplore.ieee.org/abstract/document/7953169.

2017 Lucas Ondel, Lukaš Burget, Santosh Kesiraju, and Jan Černocký. "Bayesian phonotactic language model for acoustic unit discovery". In: *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 5750–5754. URL: https://www.fit.vut.cz/research/publication/11472/.en.

2017 Matějka, Pavel, Oldřich Plchot, Ondřej Novotný, Sandro Cumani, Alicia Díez Lozano, Josef Slavíček, Mireia Sánchez Diez, František Grézl, Ondřej Glembek, Mounika Veera Kamsali, Anna Silnova, Lukáš Burget, Lucas Ondel, Santosh Kesiraju, and A. Johan Rohdin. "BUT- PT System Description for NIST LRE 2017". In: *Proceedings of NIST Language Recognition Workshop 2017*. Orlando, Florida, US: National Institute of Standards and Technology, pp. 1–6. URL: https://www.fit.vut.cz/research/publication/11655.

2017 Scharenborg, Odette, Francesco Ciannella, Shruti Palaskar, Alan Black, Florian Metze, Lucas Ondel, and Mark Hasegawa-Johnson. "Building an asr system for a low-resource language through the adaptation of a high-resource language asr system: Preliminary results". In: *Proceedings of ICNLSSP, Casablanca, Morocco*. URL: https://www.cs.cmu.edu/~fmetze/interACT//Publications_files/publications/ICNLSSP2017_adaptation_final.pdf.

2016 Brummer, Niko, Albert Swart, JJ Prieto, Paola Garcia, P Matejka, O Plchot, M Diez, A Silnova, X Jiang, O Novotný, et al. "ABC NIST SRE 2016 system description". In: *Proc. of the NIST SRE 2016 workshop*. URL: https://www.crim.ca/perso/patrick.kenny/SRE_2016_ABC_1478007109_abc-nist-sre-systemdescription_v2.pdf.

2016 Lucas Ondel, Lukáš Burget and Jan Černocký. "Variational inference for acoustic unit discovery". In: *Procedia Computer Science* 81, pp. 80–86. URL: https://www.sciencedirect.com/science/article/pii/S1877050916300473.

2016 Skácel, Miroslav, Martin Karafiát, Lucas Ondel, Albert Uchytil, and Igor Szöke. "BUT Zero-Cost Speech Recognition 2016 System Description." In: *MediaEval*. URL: http://ceur-ws.org/Vol-1739/MediaEval_2016_paper_48.pdf.

2015 Lucas Ondel, Xavier Anguera and Jordi Luque. "MASK+: Data-driven regions selection for acoustic fingerprinting". In: *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, pp. 335–339. URL: https://ieeexplore.ieee.org/document/7177986.